



Subject: Numerical methods
and algebra

Chapter: Unit 1 & 2

Category: Assignment 1

1. The radius of a circular plate is measured as 12.65 cm instead of the actual length 12.5 cm. find the following in calculating the area of the circular plate:

(i) Absolute error (ii) Relative error (iii) Percentage error

2. The following logarithmic table is given

x	f(x)=log(x)
4.0	0.60206
4.5	0.6532125
5.5	0.7403627
6.0	0.7781513

(a) Interpolate log (5) using the points x=4 and x=6

(b) Interpolate log (5) using the points x=4.5 and x=5.5

3. Find the root of $x^4 - x - 10 = 0$ approximately upto 5 iterations using Bisection Method. Let a = 1.5 and b = 2.

4. Find a root of an equation $f(x) = x^3 - x - 1$ using Newton Raphson method

5. If A is a square matrix such that $A^2 = A$, then find the value of $7A - (I + A)^3$, here I is an identity matrix.

6. Find out the inverse of $A = \begin{bmatrix} 1 & -1 & 2 \\ 4 & 0 & 6 \\ 0 & 1 & -1 \end{bmatrix}$ using elementary row transformations.

7. Sabrina walked 75 meters to the east. Then she turned 30 degrees to the left and walked 25 meters. Determine the magnitude of Sabrina's displacement vector.

8. Find all eigenvalues and corresponding eigenvectors for the matrix A if

$$\begin{pmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$

9. Use Newton's Method to determine x_2 for $f(x) = x^3 - 7x^2 + 8x - 3$ if $x_0 = 5$

10. Find the approximated value of x till 4 iterations for $e^{-x} = 3 \log(x)$ using Bisection Method.

11. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$ then find the value of $|\text{adj } A|$

12. If $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 \\ 0 & 5 & 1 \\ 0 & 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ 1 \\ -2 \end{bmatrix} = 0$. Then find the value of x .

13. If $A = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 5 & 0 \\ 2 & 1 & 8 \end{bmatrix}$ then find the inverse of the matrix using the adjoint method.

14. Construct the matrix $A = [a_{ij}]_{3 \times 3}$, where $a_{ij} = i - j$. State whether A is symmetric or skew-symmetric.